Remarks

Claims 1-8 were previously canceled. In response to the office action of September 20, 2006, claims 9-15 have been amended by reciting that a claimed layer is more "highly doped compared to"other layers. The characteristics of "highly doped n-type" semiconductor is explained in context within, for example, paragraphs 19, 41, 46 middle and paragraph 49. Accordingly no new matter has been added. Reconsideration and allowance are requested.

Claim Rejections – 35 USC 112

On page 3 of the office action, the Examiner rejected claim 12 on indefiniteness grounds and suggested a change in semicolon to correct this. In response, applicant has made the suggested change to lines 10 and 11 of claim 12. Reconsideration and withdrawal of this rejection cheerfully are requested.

Claim Rejections – 35 USC 103

No Prima Facie Obviousness.

The Examiner reasserts obviousness over JP11-307791 (earlier art to the same applicant) in combination with Yamagishi, Brandhorst Jr and/or Spitzer, page 3, bottom to page 12 in the September 20, 2006 office action.

However, prima facie obviousness does not exist because these references, even in combination, do not show the sided placement of a highly doped n-type amorphous silicon layer between a glass surface and a photoactive junction, away from an opposite surface of resin as claimed.

The patent application emphasizes and claims the use of "highly doped n-type amorphous layer" as a sodium scavenger to solve a previously unappreciated problem with moisture after water entry. The specification explains this concept term in good clarity with enough detail to teach a skilled artisan to practice this

claimed solution. However, to clear up any possible misunderstandings on the meaning of "highly doped," the claims have been amended to indicate more clearly that "a more highly doped n-type amorphous silicon layer [is] compared to that of the n-type crystalline silicon substrate." The Examiner has argued on page 4 that "[t]he term 'highly doped' does not distinguish....in the absence of some specific level of doping" but this comparative term is commonly used both in the engineering literature and in patents (including claim language) without specifying further chemical doping levels.

The claim term "highly doped" is very clear in context of the teachings and examples. The characteristics of "highly doped n-type" semiconductor is explained in context within, for example, paragraphs 19, 41, 46 middle and 49. Skilled artisans use this term as seen in over 700 issued US patents in this area obtained by searching the issued patent records. The sub-term "highly doped" is a comparative phrase that references the concentration of dopant to that in other layers. Thus, a skilled artisan knows that the dopant level is higher in the referenced layer than in other layers recited in the claim. This meaning is accepted, for example in other US patents such as U.S. Nos. 7,095,083; 6,541,695; 5,747,864 and 4,459,163.

Most of the hundreds of examined and issued patents that use this well known term do not bother with further description of a measured dopant concentration or specific recipe/procedure for manufacture of such layer, as such details are known or easily knowable to a skilled reader. An artisan knows how to make the concentration of n-type charge carriers higher in the "highly doped n-type" semiconductor layer compared to that in the n-type region of the photoactive junction. Furthermore, the claimed invention functions (provides protection to degradation from sodium poisoning) at all levels of n-dopant in the highly doped layer that exceed the other n-doped layer levels. The invention is not limited to a single specific dopant concentration but rather concerns use of a higher

concentration in the protective layer compared to the other layers, as now claimed more particularly by way of amendment that recites more precisely that "highly doped" means "more" respect to non-highly doped member recited in the same sentence.

The specification teaches, by use in context, how to make and use the "highly doped n-type" layer via repeated reference to how the layer functions, and even indirectly suggests chemical amounts of possible sodium contaminant in a working embodiment. The amount of n-dopant is required for stochiometric quenching of sodium and varying the amount for this purpose is easily done and tested, as taught in the working examples with data. The specification gives some representative sodium ranges in paragraph 27, and a skilled artisan knows or easily finds out the amount of sodium and leachability from a particular glass used. In necessary, a declaration from a skilled artisan in the filed can be provided to illuminate this fact. Paragraph 30 teaches that the sodium joins "with an impurity diffusion layer (a dope layer)...."and that this level reduces carriers, which teaches that the sodium is not catalytically removed but rather is removed stoichiometrically.

The higher the sodium concentration the higher the dopant and/or thicker the barrier layer needs to be. Paragraph 41 teaches the stochiometric process as "sodium [i.e positive charged mobile ions] atoms are shielded by a thick bulk semiconductor" of n-dopant [i.e immobile negative charges]. This principle is emphasized also in paragraphs 46, 49, and 54. The general interaction with negative charges of n-doped material being in a stochiometric ratio (of sodium combining with a negative charged dopant atom) is taught more specifically in paragraph 29 "trap level is formed.....causes carrier loss." This teaches the skilled artisan to estimate how much highly doped n-type layer to interpose in the multilayer device, to obtain a relative improvement. Thus, the specification provides 1. some representative sodium concentration values in resins, 2.

explains a source of sodium from glass, 3. teaches to use an increased level of n-dopant in a protective layer on one particular side of the photoactive junction for an effect.

No motivation to combine JP791 with other references (Yamagishi '556; Green '050; Brandhorst '486 and Stitzer '060).

Even under an implicit motivation theory based on an analysis of problem and solution, implicit motivation for combining is lacking because there is no analogous problem and/or solution with the cited art. The nature of the problem and solution taught by JP791 and the other cited references differ from the problem and solution in the present claimed invention.

The Court of Appeals for the Federal Circuit recently clarified the test for "implicit motivation" in an obviousness combination of prior art references, in the October 3, 2006 Dystar Textilfarben v. Patrick Co. case (see www.fedcir.org/opinions/06-1088.pdf). The Federal Circuit summarized that "implicit motivation" for obviousness requires: 1. determining the level of a skilled artisan in the field of an invention; 2. determining the common knowledge of that person, and finally; 3. considering the nature of the problem to be solved. Further, a finding of implicit motivation may require an explanation of "why 'common sense' of an ordinary artisan seeking to solve the problem at hand would have led him to combine the references." Evidence of "why" may be a resulting "product or process that is more desirable" such as a cheaper or more convenient product.

The JP791 reference, which is earlier art from the applicant/assignee of the present case, addressed an earlier and very different problem, with a very different solution. Sanyo researchers in JP791 studied reflections from scattered light to improve solar cell efficiency. JP791 does not at all relate to the degradation by water problem that Sanyo later studied when comparing a less

desirable lamination manufacturing process using aluminum film with a more desirable module having "only including a PVF film" as reported in paragraph 26. No common sense would lead a worker studying light reflections using different backing and configurations to try the particular configuration as claimed in this later discovery, or to find missing elements in the other cited US patents to arrive at the claim elements now recited.

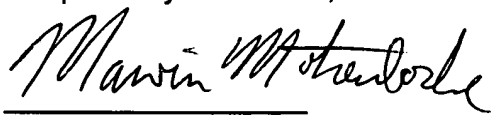
The other references also fail to indicate any basis for a common sense desire to try the claimed invention. Yamagishi studied adhesive strength issues, and actually leads away from the problem and especially the solution discovered in the present claims, by instead emphasizing "penetration of water through an interface between the substrate and the encapsulant at the peripheral portion of the solar cell module...it is highly desired to prevent the penetration of water through a peripheral portion of the solar cell module and to improve the weather resistance...." (c. 1 line 64 through top of c. 2). This teaches away from dealing with downstream consequences of water mobilized sodium, with a drastically different view of the water problem that requires blockage of initial water entry to prevent the problem solved by the claimed invention.

This is very different from the present approach, wherein sodium leaching from water already entered via resin layer permeation is quenched via an interposed n-doped scavenging layer on a selected side of the photoactive junction inside the device. Clearly, there is no motivation here as this teaches away from the inventive solution discovered. The Examiner commented on page 6 that low cost and "excellent weather resistance" would motivate a worker to use soda lime glass, but adding glass to a pre-existing structure is not the combination that would lead to the claims. Even if one were prompted to add glass to an existing art structure, that combination is not the claimed invention.

Hanaoka is cited as merely showing the use of "glass or a resin" on the front surface, but the problem and solution differ greatly, and no other relevant details are taught by Hanaoka. Instead, applicant has crafted a unique combination of layers that are added to a glass substrate, based on an insight about sodium diffusion. Again, simply adding glass to any preexisting structure, either actually made or described on paper, does not achieve the aim or the claimed invention. It is noteworthy that placement of the quenching highly doped n-type amorphous layer specifically between the glass and the active junction (only and not the other side) is not described. Thus, there is no implicit or explicit motivation for this feature combination.

Entry of the claim amendments, reconsideration and allowance earnestly are requested. If a telephonic interview can facilitate disposition of this case, the Examiner cordially is requested to contact the undersigned attorney at 540-729-8833.

Respectfully submitted,



Marvin Motsenbocker
Reg. No. 36,614
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NDQM WATCHSTONE LLP
1300 Eye Street, N.W.
Suite 400 East Tower
Washington, D.C. 20005